

**STATEMENT OF WORK FOR REMEDIAL INVESTIGATION
/ FEASIBILITY STUDY (RI/FS)
CALCASIEU ESTUARY COOPERATIVE SITE
June 2, 1999**

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FEASIBILITY STUDY (RI/FS)
CALCASIEU ESTUARY COOPERATIVE SITE
JUNE 2, 1999**

Contractor: CDM Federal Programs Corporation
Contract: 68-W5-0022
Work Assignment #: 041RI-CO-06FY
Site ID No# LAD0002368173
Spill ID #: FY

Introduction

Site Description

The Site is located in the proximity of Lake Charles, Louisiana and is comprised of the surface waters, dredge spoil areas, sediments, and related wetlands in, along, and adjacent to Bayou d' Inde, Bayou Verdine, Bayou Olsen, Coon Island, Clooney Island and the Calcasieu River from the northern end of Moss Lake to the saltwater barrier, and any other area that may subsequently be included.

History

Calcasieu is an industrialized area where several petrochemical and agrochemical plants manufacture and process diverse products such as petroleum, butadiene, synthetic rubber, metals, trichloroethylene, ethylene dichloride, and perchloroethylene.

The Louisiana Department of Health and Hospitals (LDHH) issued a Fish and Shellfish Consumption Health Advisory for Bayou d'Inde in January 1987. In addition, LDHH issued an informational Health advisory in 1992 for the Calcasieu Estuary and Bayou Olsen.

Many sampling studies have been conducted in the Calcasieu Estuary over the past 10 years. EPA conducted a sampling inspection in an area in lower Bayou d'Inde where proposed dredging was to occur and released a focused site assessment report in August 1997 indicating that there were several contaminants (HCB, HCBd, Cooper, Lead Mercury, PCBs) above screening human health and ecological risk assessment benchmarks.

Purpose of Investigation

The primary purpose of the investigation is to: 1) determine the nature and extent of the sediment contamination, 2) evaluate the risks posed to human health and the environment because of the sediment contamination, and 3) determine appropriate remedial alternatives to mitigate the risks. In addition, the secondary purpose of the investigation is to gather a limited amount of information to identify potential

sources that have contaminated the sediments (i.e., runoff, solid waste management units, groundwater discharge to surface waters, etc.).

General Requirements

The contractor shall conduct the RI/FS in accordance with this SOW and all other relevant guidance used by EPA in conducting an RI/FS. The primary contact for this work assignment is Stacey Bennett (WAM) Tel. (214) 665-6729. The Region 6 Project Officer is Tom Reilly, Tel. (214) 665-8307, and the Region 8 Contracting Officer is Mr. Andy Hamp, Tel. (303) 312-6311.

A summary of the major deliverables and a suggested schedule for Submittals are attached (Attachment 1).

A list of primary guidance and reference material is attached (Attachment 2). In all cases, the contractor shall use the most recently issued guidance.

The contractor shall communicate at least weekly with the Work Assignment Manager/Remedial Project Manager (WAM/RPM), either in face-to-face meetings, through conference calls, or email (bennett.stacey@epa.gov).

The contractor shall notify the CO PO/WAM when 75 percent of the approved work assignment budget has been expended and when 95 percent has been expended.

EPA shall provide oversight of contractor activities throughout the RI/FS. EPA review and approval of deliverables is a tool to assist this process and to satisfy, in part, EPA's responsibility to provide effective protection of public health, welfare, and the environment. EPA shall review deliverables to assess the likelihood that the RI/FS will achieve its goals and that its performance requirements have been met. Acceptance of deliverables by EPA does not relieve the contractor of responsibility for the adequacy of the deliverables.

Performance Period

The period of performance for this work assignment commences on May 1, 1999, and will continue through September 30, 2000. If the contractor has not completed the RI/FS reports by September 30, 2000, then the Agency will conduct all remaining work under a separate work assignment.

Record-Keeping Requirements

The contractor shall maintain all technical and financial records for the RI/FS in accordance with the contract. Throughout the period during which the contractor is conducting the RI/FS activities, the contractor shall submit one hard copy of each technical memorandum, data summary or other document produced pursuant to this SOW related to the RI/FS to the WAM/RPM for inclusion in the

official record. All of the deliverables listed in the attachment shall be saved in WordPerfect /Corel 8.0 for Text and ACCESS for data on 3.5 inch disk and a compact disc.

The contractor shall provide a separate cost accounting for the areas of concern listed below.

- Area A - Bayou d'Inde
- Area B - Bayou Verdine
- Area C - Upper Calcasieu (From the intersection of Bayou d'Inde and the Calcasieu Ship Channel northward to the salt water barrier in Lake Charles, including Coon Island and Clooney Island)
- Area D - Lower Calcasieu (From the intersection of Bayou d'Inde and the Calcasieu Ship Channel southward to the mouth of Moss Lake, including Bayou Olsen)

Task 1 Project Planning and Support

The purpose of this task is to determine how the RI/FS will be managed and controlled. The following activities shall be performed as part of the project planning task:

1.1 Project Planning/Work Plan.

This task includes efforts related to project initiation.

Within two days after receipt and acknowledgment of this work assignment, the Contractor shall schedule/coordinate with the WAM a kick-off/scoping meeting, a site familiarization visit, and a meeting to the Region 6 office for background/file reviews.

1.1.2 Attend Kickoff/Scoping meeting. The contractor shall attend a kick-off/scoping meeting within 2 weeks after receipt and acknowledgment of this work assignment with the CO/PO/WAM to discuss the scope of the work assignment. In addition, the contractor shall accompany the WAM to the site within 2 weeks after the kick-off/scoping meeting.

1.1.3 Evaluate Existing Information/File Review.

The Contractor shall schedule/coordinate with the WAM a visit to the Regional EPA office for the review of existing information within 2 weeks after the kick-off/scoping meeting. During this week visit, the WAM along with other EPA offices/programs staff will provide the Contractor with an overview of activities and data already completed in order to prevent duplication of efforts. The following is a list of available information that the

Contractor should be aware of that exists for the site. The brackets indicate the Agency where the Contractor should may obtain this information.

- a. NOAA contaminant database **[NOAA]**
- b. General geographic location; **[GIS map]**
Property lines, with the present fee simple (excluding mineral interest owners) owners of all property adjacent to and within the Individual industry facilities clearly indicated; [**RCRA application permits for all facilities located along Study Area in Calcasieu Parish and data from the Calcasieu Parish Courthouse**]
- c. Topography (with a contour interval of five (5) feet and an approximate scale of 1 inch = 200 feet), waterways, all wetlands, floodplains, surface water features, and drainage patterns. In addition, a map(s) shall be prepared which shows the bathymetry of the adjacent bay areas of the Area of Concern; **[GIS maps]**
- d. Current and to the extent known, general historical Information regarding the location of all major: (1) tanks; buildings; process areas; raw material and product storage sites; utilities; paved areas; roadways; railways; easements; and rights-of-way; (2) hazardous substance storage and disposal areas at the Individual industry facilities; (3) product, process, waste, hydrocarbon and other piping; and (4) other pertinent features; [**RCRA application permits**]
- e. Surrounding land uses (residential, commercial, agricultural, recreational), including aerial photographic history to the extent available; **[Courthouse]**
- f. The location of all current and historic groundwater monitoring wells, production wells, private and public drinking water wells, and piezometers at the individual industry facilities; **[NPDES files and USGS]**
- g. Current and historical information regarding the location of all current point sources of water discharged, including permitted wastewater and stormwater outfalls, industrial stormwater, and sanitary sewer systems and associated ditches, canals and piping at the Individual industry facilities; **[NPDES files]**
- h. Current and historical air emission points of relevant Plant areas; **[TRI data]**
- i. Location of ecological features of the Area of Concern (e.g. oyster and Rangia reefs, submerged aquatic vegetation, wetlands, and coastal prairie). [**U.S. Fish and Wildlife, LA Wildlife and Fisheries, LA Natural Resources**]
- j. Residential areas within 1 mile from the outer boundaries of the Area of Concern. **[U.S. Census Bureau]**
- k. Special populations (e.g., hospitals, daycares) within 1 mile from the outer boundaries of the Area of Concern. **[GIS maps and Fire Departments]**
- l. Wildlife reserves, bird sanctuaries, or endangered species within 1 mile from the outer boundaries of the Area of Concern. **[LA Wildlife and Fisheries and USFWS]**
- m. Areas which have informational health advisories for the Area of Concern. **[LA Health and Hospitals]**

- 1.1.4 Develop RI/FS Work Plan. The contractor shall prepare and submit a RI/FS Work Plan by June 21, 1999 to the CO, PO and WAM.
- 1.1.5 Develop Narrative. The RI/FS Work Plan shall include a comprehensive description of project tasks, the procedures to accomplish them, project documentation, and project schedule. The contractor shall use their quality assurance/quality control (QA/QC) systems and procedures to assure that the work plan and other deliverables are of professional quality requiring only minor revisions. Specifically, the Work Plan shall include the following:

- Ë The contractor's technical approach to each task to be performed, including a detailed description of each task; the assumptions used; any information to be produced during and at the conclusion of each task; and a description of the work products that will be submitted to USEPA. Information shall be presented in a sequence consistent with SOW.
- Ë A schedule with specific dates for completion of each required activity and submission of each deliverable required by the SOW. This schedule shall also include information regarding timing, initiation, and completion of all critical path milestones for each activity and deliverable and the expected review time for USEPA. The contractor shall mirror the deliverables and schedule provided in the Attachment to the extent possible.
- Ë A list of key contractor personnel providing support on the work assignment.

1.1.3.1 Prepare Revised Work Plan (if necessary)

Attend Fact Finding/Negotiation Meeting or Conference Call. The contractor shall participate in a Work Plan fact finding/negotiation meeting with Region 6 WAM/CO/PO. USEPA Region 6 staff and the Contractor will discuss and agree upon the final technical approach and costs required to accomplish the tasks outlined in the SOW.

Prepare & Submit Revised Work Plan. The contractor shall prepare and submit a revised work plan incorporating the agreements made in the fact finding/negotiation meeting within 2 weeks after the meeting.

1.2 Development of Site-Specific Plans

1.2.1 Develop Initial Site Conceptual Model(s)

Within 45 days after the file review meeting, the Contractor shall prepare an initial site conceptual model(s) for the Areas of Concern. The intent of the models is to identify locations for early action and to provide input into the RI Workplans. The preliminary conceptual site models will identify contaminants of potential concern; describe possible sources excluding industrial air emissions; identify potential release mechanisms; identify potentially contaminated transport media; describe possible exposure pathways; identify potential human receptors; identify habitats and potential ecological receptors and facilitate assessment of possible impacts on the identified receptors (EPA 1988, 1989a). The contractor should use the information in Task 1.1.3 (Existing Information/File Review) to develop the initial site conceptual model. If additional sources are used to develop this initial site conceptual model, the contractor shall identify the sources of information sources.

1.2.2 Develop Sampling and Analysis Plan

Within 60 days after the file review and briefing meetings with the Region 6 staff, the contractor shall prepare a SAP for the all of the area(s) of concern. The first SAP model deliverable shall be for the Bayou D'Inde area of concern. The using the guidance on Data Quality Objectives as described in Contractor shall develop the SAP EPA QA/G-4 Guidance for the Data Quality Objectives Process, September 1994 (The web site for this guidance is found at <http://www.epa.gov/r10earth/offices/oea/qaindex.htm>). In addition, specific media to be considered is found in Task 3.0.

The Contractor shall prepare a plan to document all monitoring procedures: sampling, field measurements and sample analysis performed during the investigation to characterize the sediment contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented. The Contractor should include a table showing each sample type, general location, and specific analytical procedure and the data quality objectives. In addition, the contractor may include a recommendation and supporting rationale for a reduced list of constituents from the hazardous substance list (40 CFR Part 302) to be analyzed for in each media. (For additional details on the media to be included in the sampling plan, see Task 3)

The Sampling section of the Sampling and Analysis Plan shall discuss:

- a. Selecting appropriate sampling locations, depths, etc.;
- b. Providing a statistically sufficient number of sampling sites;

- c. Measuring all necessary ancillary data;
- d. Determining conditions under which sampling should be conducted;
- e. Each media to be sampled (See Task 3.1.2 for medias to include);
- f. Determining which parameters are to be measured and where;
- g. Selecting the frequency of sampling and length of sampling period;
- h. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;
- i. Documenting field sampling operations and procedures, including:
 - i) Documentation of procedures for preparation of Reagents or supplies which become an integral part of the sample (e.g., filters, and adsorbing reagents);
 - ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;
 - iii) Documentation of specific sample preservation method;
 - iv) Calibration of field devices;
 - v) Collection of replicate samples;
 - vi) Submission of field-biased blanks, where appropriate;
 - vii) Potential interferences present
 - vii) Construction materials and techniques, associated with monitoring wells and piezometers;
 - ix) Field equipment listing and sample containers;
 - x) Sampling order; and
 - xi) Decontamination procedures.
- j. Selecting appropriate sample containers;
- k. Sample preservation; and
- l. Chain-of-custody, including:
 - i) Standardized field tracking reporting forms to establish sample custody in the field prior to shipment; and
 - ii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

The Field Measurements section of the Sampling Plan shall address:

- a. Selecting appropriate field measurement locations, depths, etc.;
- b. Providing a statistically sufficient number of field measurements;
- c. Measuring all necessary ancillary data;
- d. Determining conditions under which field measurement should be conducted;
- e. Determining which media are to be addressed by appropriate field measurements [Media to be included are discussed in Task 3.1.2]
- f. Determining which parameters are to be measured, how, and where;
- e. Selecting the frequency of field measurement and length of field measurements period;

- f. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;
- i. Documenting field measurement operations and procedures, including:
 - i) Procedures and forms for recording raw data and the exact location, time, and project considerations associated with the data acquisition;
 - ii) Calibration of field devices;
 - iii) Collection of replicate measurements;
 - iv) Submission of field-biased blanks, where appropriate;
 - v) Potential interferences present ;
 - vi) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;
 - vii) Field equipment listing;
 - viii) Order in which field measurements were made; and
 - ix) Decontamination procedures.

1.2.3 Health and Safety Plan

The Contractor shall prepare Health and Safety Plans for the field activities required to conduct the Remedial Investigation. The Health and Safety Plan shall be submitted at the same time as the Field Sampling Plan.

1.2.3.1 Major elements of the Health and Safety Plans shall include:

- a. Description of the work site including availability of resources such as roads, water Supply, electricity and telephone service;
- b. Description of the known hazards and evaluation of the risks associated with each activity conducted, including, but not limited to on and off-site exposure to contaminants.
- c. List key personnel and alternates responsible for work site safety, response operations, and for protection of public health;
- d. Description of methods for delineation of work zones and associated support zones if required;
- e. Description of levels of protection to be worn by personnel i.e, Personal Protective Equipment) for each task in work area;
- f. Procedures to control work site access;
- g. Description of decontamination procedures for personnel and equipment;
- h. Work site emergency procedures;
- i. Emergency medical care and medical surveillance requirements;
- j. Description of the frequency and types of air monitoring, personnel monitoring, and work environment sampling techniques and instrumentation to be use
- k. Any routine and special training required for Contractor's Employees or

- subcontractors;
- l. Standard operating procedures for the work site, e.g., confined space entries, protecting workers from weather-related problems;
- m. A contingency plan that meets the requirements of 29 CFR 1910.120(l)(1) and (l)(2).

1.2.3.2 The Health and Safety Plans shall be consistent with:

- a. OSHA regulations particularly in 29 CFR 1910 and 1926;
- b. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
- c. EPA Order 1440.1 - Respiratory Protection;
- d. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

1.2.4 Data Management

The EPA will provide the Contractor with a database (developed by NOAA) which contains the results of sampling conducted by EPA and various industries. The contractor shall use the same database format and include the results of additional sampling conducted under this work assignment. This database will be used throughout the RI/FS for several purposes such as identifying data gaps and identifying areas of contamination.

1.3 Project Management

The contractor shall perform general work assignment management including management and tracking of costs, preparation of Monthly Progress Reports, attendance at project meetings, and preparation and submittal of invoices. It is anticipated that the period of performance for this project is from May 1999 to September 30, 2000.

1.3.1 Prepare Monthly Status Reports. The contractor shall prepare monthly progress reports in accordance with the requirements under the contract.

1.3.1.1 Document Cost and Performance Status. The contractor shall document the technical progress and status of each task in the WBS for the reporting period in accordance with contract requirements. The contractor shall report costs and level of effort (by P-level) for the reporting period as well as cumulative amounts expended to date.

1.3.1.2 Prepare and Submit Invoices. Monthly invoices will be prepared and submitted in accordance with the level of detail as specified in the contract.

1.3.1.3 Progress Reports

The Contractor shall at a minimum provide the State and EPA with signed, monthly progress reports containing:

- a.. A description and estimate of the percentage of the RI completed;
- b. A summary of all field data and test results required under approved work plans and all validated analytical data obtained during the preceding month;
- c. An index of raw data collected during the month;
- d. Summary of modeling activities conducted during the month;
- e. Summary of work planned for the next two months with schedules relating such work to the overall project schedule for RI/FS completion;
- f. Summaries of all problems/delays or anticipated problems/delays encountered during the reporting period and solutions developed and implemented to address any actual or anticipated problems/delays;
- g. Summaries of all contacts with representatives of the local community, public interest groups or the State government during the reporting period; and
- h. Changes in contact personnel during the reporting period;
- i. A Microsoft Project Schedule shall be submitted initially with the work plan and updated monthly with each progress report.

1.3.1.4 Weekly Status Reports

At the conclusion of each work week, the contractor shall provide to the WAM via email an outline of the weeks' major accomplishments. The content of the email should address minor problems [Major problems should have been already communicated to the WAM via phone call]. In addition, the contractor shall send a separate weekly email to the WAM and toxicologists for progress on the risk assessments.

1.4 Subcontract Procurement and Support Activities

1.4.1 Identification and Procurement of Subcontractors. Procure and administer the necessary subcontracts, including, but not limited to the following:

1.4.1.1 Drilling Subcontractor

1.4.1.2 Surveying Subcontractor

- 1.4.2 Develop Subcontractor QA/QC Program. The contractor shall review, approve, and monitor the subcontractor's QA/QC program and conduct audits, as required.
- 1.4.3 Perform Subcontract Management. The contractor shall perform the necessary management and oversight of any subcontractor(s). The contractor shall institute procedures, monitor progress, and maintain systems and records to ensure that the work proceeds according to contract requirements. The contractor shall review and approve subcontractors' invoices and issue any necessary contract modifications.

TASK 2 COMMUNITY RELATIONS

The Contractor shall provide the following technical support services:

2.1 Response to Comments on Interim Deliverables.

The contractor shall provide technical support to assist EPA in the preparation of written responses to technical issues for interim deliverables (i.e., SOW, Risk Assessments and Technical Memorandums, SAPs) which may be received from all stakeholders (i.e., Federal/State Agencies, the public)

2.2 Proposed Plan Support

The contractor shall estimate that two reviews of the draft will occur for the proposed plan.. The development of technical information for fact sheet material shall be performed under this task. All other Community Relations Support for this Site has been provided to the Contractor in a separate Work Assignment (WA# 040-CRCR-06FY). All technical support services listed above shall be charged to this work assignment and **not** included in the Community Involvement Work assignment.

TASK 3 FIELD INVESTIGATION

3.1 Data Collection Strategy

The purpose of the RI/FS is to characterize the nature and extent of sediment contamination and to determine the associated risks from the contamination. The site has been divided into 4 areas for the purposes of the ease of management of the site. The contractor has the option of recommending a variation of dividing the area and the rationale for the subdivision. The contractor should use the Region 5 FIELDS procedure for determining sampling gridding for nature and extent of contamination. For additional information on the Region 5 FIELDS procedure, the website is

www.epa.gov/r5water/fields/FIELDSITE/SHARED/PAGES/FLDHOMETHM

3.1.2 Sampling Medias for Consideration

The contractor should develop the sampling and analysis plan to include the following medias.

A. Sediment - The contractor shall design a sampling and analysis plan for the evaluation of current sediment contamination. This evaluation must include horizontal as well as vertical extent of contamination. In addition, the sampling plan must consider the human health and ecological risks associated with sediment contamination as described in Task 7.

B. Soils -The contractor shall design a sampling and analysis plan for the evaluation of soils. The definition of soils for this work assignment only includes wetland soils, dredged spoil islands, and the banks of the area(s) of concern. The purpose of the sampling dredged spoil islands and the banks of area(s) of concern is to identify sources which may have impacted the sediments. The contractor should only consider a limited number of samples for this specific purpose. Wetlands soil samples are for the purpose of determining nature and extent of contamination as well as for risk.

C. Biota- The contractor shall design a sampling and analysis plan for the evaluation of biota. The purpose is to characterize the biota of ecosystems potentially affected by contamination within the Area of Concern for the purposes of the risk assessment (Task 7). The contractor should only consider a limited number of samples for this specific purpose.

D. Surface Water- The contractor shall conduct an investigation to evaluate surface water for the purpose of the Risk Assessment as described in Task 7 (To evaluate the food chain, the contractor should consider fate and transport modeling for determining sediment and water movement). Parameters for surface water may include pH, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3 , NO_3^- , NO_2^- , PO_4^{3-}), and chemical oxygen demand. The contractor should only consider a limited number of samples for this specific purpose.

E. Shallow Groundwater -Contractor shall conduct an investigation to identify shallow groundwater contamination as it has impacted the sediments. The purpose of investigating shallow groundwater is not to characterize the entire shallow groundwater within the area of concern, but to determine whether there is a hydraulic connection between the shallow groundwater and the sediments. The contractor should only consider a limited number of samples for this specific purpose. If the contractor identifies that there is an impact to the sediments via shallow-groundwater contamination, the sampling and analysis plan should include following information:

1. Presence or absence of contamination within the Area of Concern;
2. The velocity of groundwater movement;

F. Source Area Contamination - The Contractor may, in very limited cases, sample a

solid waste management unit at the direction of the WAM for the purpose of determining whether waste management unit (located outside the boundaries of the area of concern) is impacting the sediments. When directed to, for each of these areas identified, the Contractor shall identify the following:

1. Location of unit/area (which shall be depicted on a facility map);
2. Hazardous substances, to the extent known;
3. Estimated quantity of each hazardous substance present; and
4. Identification of areas where additional information is necessary.

The contractor may also identify other suspected source areas of contamination from RCRA.

3.1.3. Other Data Collection

The contractor shall collect the following additional data:

- A. The contractor shall confirm the location of all NPDES discharge points via global positioning system. A preliminary list will be provided by EPA.
- B. A summary of all independent dredging activities that have occurred within the area(s) of concern.
- C. The Contractor shall review existing information to determine current hydraulic interconnections with adjacent surface water bodies:

3.2 Phased Sampling

It is anticipated that the contractor will conduct phased sampling. This phased sampling may consist of the following:

Phase I- Based on historical contamination information in the NOAA database, the contractor should establish the boundaries of the sediment contamination using a grid analyses. The contractor should use the Region 5 grid procedures as outlined in the Attachment.

Phase II- Additional sampling may occur to identify additional areas of contamination that have not been previously identified, identify additional data gaps based on Phase I information, or risk assessment data needs.

Phase III- A limited amount of samples should be taken to identify the pathway and source of contamination identified in previous phases. These sources of contamination may include dredge spoils, solid management units, or groundwater-to-surface water contamination affecting the sediments.

3.3. Site Access

The Contractor will be responsible for coordinating with the U.S. Coast Guard and other appropriate agencies for the collection of samples within the waterways. EPA will obtain access for the dredged spoil island from the appropriate Agency. If the Contractor proposes collecting samples from any other area to attribute contamination (i.e., solid waste management units), the SAP shall include the name and address of the property owner along with a legal description of the property from where samples are to be taken.

3.4 Pre-Investigation Evaluation of Remedial Alternative Technologies

Contractor shall develop a listing of candidate technologies for contaminated sediment media which represent a potential risk to human health and the environment based on available data. The list should be limited to the following or a combination of the following:

- A. Dredging
- B. Capping
- C. Natural Attenuation
- D. No action

The contractor shall provide a technical memorandum deliverable for the initial list of remedial technologies. The listing of candidate technologies will be updated as necessary throughout the RI process and finalized in Task 12 of the Feasibility Study. In conjunction with this effort, Contractor will identify relevant site characteristics which influence the evaluation of these technologies and should be considered in the development of the Remedial Investigation work plan. As supported by the availability of existing information, recommendations for treatability studies (Task 8) may be developed as part of this effort.

TASK 4 SAMPLE ANALYSIS

The Contractor may use or be directed to utilize a variety of mechanism for the analysis of environmental samples such as the EPA Contract Laboratory Program (CLP), mobile laboratories, field laboratories, laboratories procured under subpool or Team subcontracts, the Environmental Response Team (ERT) laboratory or Regionally procured laboratories. The Contractor shall use a team subcontractor for dioxin analysis. To arrange CLP training and services, the contractor shall contact the Sample Control Center at the EPA Region 6 Laboratory in Houston, TX (281) 983-2137. A CLP Sample Request Form is provided in the Attachment.

TASK 5 DATA VALIDATION

The sample validation task begins with reserving sample slots in the CLP and the completion of the field sampling program. This task ends with the contractor validating the analytical data received from the laboratory.

The contractor shall perform the following activities or combination of activities:

5.1 Prepare and Ship Environmental Samples

- 5.1.1 Sediment Samples
- 5.1.2 Surface-Water
- 5.1.3 Biota Samples
- 5.1.4 Ground-Water Samples
- 5.1.5 Other Types of Media Sampling as approved by EPA

5.2 Coordinate with Appropriate Sample Management Personnel

5.3 Implement EPA-Approved Laboratory QA Program.

5.4 Provide Sample Management (Chain of Custody, Sample Retention, and Data Storage) Ensure the Proper Management of Samples. The contractor shall ensure accurate chain-of-custody procedures for sample tracking, protective sample packing techniques, and proper sample-preservation techniques.

5.5 Validate Data. The contractor shall validate the data to ensure that the data are accurate and defensible.

- 5.5.1 Review Analysis Results Against Validation Criteria. The contractor shall review the data analysis results against the validation criteria.
- 5.5.2 Provide Written Documentation of Validation Efforts. The contractor shall develop a Data Validation Report to the Work Assignment Manager after all the data has been validated.

TASK 6 DATA EVALUATION

The contractor shall organize and evaluate data gathered during the confines of this work assignment that will be used later in the RI/FS effort. Data evaluation begins with the receipt of analytical data from the data acquisition task and ends with the submittal of the Data Evaluation Summary Report. Specifically, the contractor shall perform the following activities or combination of activities during the data evaluation effort:

- 6.1 Data Usability Evaluation and Field QA/QC. The contractor shall evaluate the usability of the data.
- 6.2 Data Reduction, Tabulation, and Evaluation. The contractor shall evaluate, interpret, and tabulate data in an appropriate presentation format for final data tables. The contractor shall design and set up an appropriate database for pertinent information collected that will be used during the RI/FS.
 - 6.2.1 Evaluate Geological Data (Sediments). The contractor shall evaluate the sediment data.
 - 6.2.2 Evaluate Hydrogeological Data (Shall-Ground Water). The contractor shall evaluate the shallow groundwater data.
 - 6.2.3 Evaluate Hydrogeological Data (Surface Water). The contractor shall evaluate the surface water.
 - 6.2.6 Evaluate Ecological Data. The contractor shall evaluate the ecological data.
- 6.3 Modeling. With the exception of fate and transport modeling for the risk assessment (see task 3.1.2 D), no modeling is expected for this work assignment. However, if the contractor recommends modeling which is necessary for the characterization of sediment contamination, then this must be approved by the WAM on a case-by-case basis.
- 6.4 Develop Data Evaluation Report. The contractor shall evaluate and present results in a Data Evaluation Summary Report and submit to the WAM/RPM for review and approval. After the WAM/RPM's review, the contractor shall attend a meeting with EPA to discuss data evaluation results and next steps.
- 6.5. ARAR ANALYSIS

The Contractor shall identify all contaminant or location specific applicable or relevant and appropriate standards (ARARs), requirements, criteria, or limitations for the protection of human health or the environment (e.g. National Ambient Air Quality Standards, RCRA, Air Toxics Guidelines, groundwater protection standards, State water quality standards, RECAP, Ambient Water Quality Criteria, Executive Order 11990, etc.). ARAR analysis shall be consistent with EPA guidance (EPA, 1989e).

TASK 7 ASSESSMENT OF RISK

7.1 HUMAN HEALTH RISK ASSESSMENT (HHRA)

7.1.1 Contaminant Identification

The Contractor will review the data from Task 1.1.3 (contaminants were also to be identified in the initial site conceptual model in Task 1.2.1) and the data collected during the Remedial Investigation and identify the major contaminants of concern within 30 days of completion of initial site conceptual model (Task 1.2.1). Contaminants of concern should be selected based on their intrinsic toxicological properties because they are present in large quantities, and/or because they are currently in, or potentially may migrate into, critical exposure pathways. Screening methods consistent with EPA guidance may be used to limit the number of contaminants of concern (EPA, 1989). The EPA RPM should be consulted regarding the screening procedure for Contaminants of Concern.

7.1.2 Exposure Assessment

Prior to the development of this task (exposure assessment), the Contractor shall meet with the RPM and Risk assessors to discuss the parameters and scenarios.

The Contractor will modify the preliminary conceptual site model developed in Task 1.2.1 to identify actual or potential exposure pathways, characterize potentially exposed populations, and evaluate the actual or potential extent of exposure. Exposure will be quantified in accordance with applicable EPA guidance. The HHRA will focus on exposures to sediment, water, and fish and shellfish through a swimming and fish consumption scenarios. The HHRA should examine average and reasonable maximum exposures for each scenario. Site specific exposure parameters may need to be developed to evaluate risk to the local population (e.g., fish consumption by recreation and subsistence fishers).

The contractor shall submit the following deliverables:

- A. The Contractor shall submit an Exposure Assessment Technical Memorandum 30 days after completion of Task 7.1.1. The Exposure Assessment Technical Memorandum should provide exposure scenarios and parameters to be used in the HHRA and should identify the need for the development of site specific exposure parameters.
- B. The Contractor shall submit a sampling and analysis plan(if necessary) to address the data gaps identified in the exposure assessment technical memorandum. The contractor should combine this sampling plan with the sampling plan required in Task 7.2.2.2 (D).

7.1.3 Toxicity Assessment

The Contractor will provide a toxicity assessment of those chemicals identified as contaminants of concern in Task 7.1.1. This will involve an assessment of the types of adverse health effects associated with chemical exposures, the relationships between magnitude of exposures, the relationships between magnitude of exposures and adverse effects, and the related uncertainties for contaminant toxicity. Integrated Risk Information System (IRIS) and Health Effects Assessment Summary Tables (HEAST) are the preferred sources of toxicological values. EPA should be consulted 60 days before Draft HHRA if toxicological information is not available in either IRIS or HEAST.

7.1.4 Risk Characterization

The Contractor will integrate information developed during the exposure and toxicity assessments to characterize the current or potential risk to human health. This characterization should identify the potential for adverse health effects for the contaminants of concern and identify any uncertainties associated with contaminant(s), toxicity(ies), and/or exposure assumptions. This section should contain a qualitative uncertainty assessment to examine the assumptions used in the Risk Assessment.

7.1.5 Draft HHRA

The contractor shall submit the Draft HHRA to the EPA. The Draft HHRA is a report of all the information in Tasks 7.1.1- 7.1.4

7.1.6 Final HHRA

After the Contractor has received comments from EPA on the Draft HHRA, the contractor shall revise the HHRA. Based on the number of comments received, EPA may elect to have the final HHRA incorporated in the RI/FS report or may have the final HHRA as a separate document. The contractor shall contact the RPM for instructions.

7.2 ECOLOGICAL RISK ASSESSMENT (ERA)

At least one meeting among the agencies and the Contractor should occur prior to initiation of the Screening ERA to assure that there is a common understanding of that step in the ERA process. Frequent meetings are needed at critical steps in the ERA process to assure that rapid progress can be made on this task and to minimize miss-steps that would delay the process.

7.2.1 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

7.2.1.1 SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL

EFFECTS EVALUATION (ERA Step 1)

The screening-level problem formulation and ecological effects evaluation is part of the initial ecological risk screening assessment. For this initial step, it is likely that site-specific information for determining the nature and extent of contamination and for characterizing ecological receptors at the site is limited. This step includes all the functions of problem formulation (more fully described in ERA Steps 3 and 4) and ecological effects analysis, but on a screening level. The results of this step will be used in conjunction with exposure estimates in the preliminary risk calculation in ERA Step 2.

A. SCREENING-LEVEL PROBLEM FORMULATION

1. Environmental Setting and Contaminants at the Site
2. Contaminant Fate and Transport
3. Ecological toxicity and Potential Receptors
4. Complete Exposure Pathways
5. Assessment and Measurement Endpoints

B. SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

1. Preferred Toxicity Data (e.g., NOAA Effects Range-Low)
2. Dose Conversions
3. Uncertainty Assessment

The EPA will provide the ecological toxicity screening values to be used in ERA Step 1.

7.2.1.2 SCREENING-LEVEL EXPOSURE ESTIMATE AND RISK CALCULATION (ERA Step 2)

The screening-level exposure estimate and risk calculation comprise the second step in the ecological risk screening for a site. Risk is estimated by comparing maximum documented exposure concentrations (Task 1.1.3) with the ecological toxicity screening values from ERA Step 1 (Task 7.2.1.1). At the conclusion of ERA Step 2, the EPA RPM and risk assessment team will decide that either the screening-level ecological risk assessment is adequate to determine that ecological threats are negligible, or the process should continue to a more detailed ecological risk assessment (ERA Steps 3 through 7). If the process continues, the screening-level assessment serves to identify exposure pathways and preliminary contaminants of concern for the baseline risk assessment by eliminating those contaminants and exposure pathways that pose negligible risks.

A. SCREENING-LEVEL EXPOSURE ESTIMATES

1. Exposure Parameters (using data from Task 1.1.3)
2. Uncertainty Assessment

B. SCREENING-LEVEL RISK CALCULATION

A quantitative screening-level risk will be calculated using the exposure estimates from Task 7.2.1.2 and the screening ecological effects (toxicity) evaluation from Task 7.2.1.1). For the screening-level risk calculation, the hazard quotient approach will be used to estimate risk.

7.2.1.3 PRELIMINARY SERA REPORT

The contractor shall submit the draft screening ecological risk assessment report (Tasks 7.2.1.1 and 7.2.1.2) within 30 days after completion of the site conceptual model (Task 1.2.1).

7.2.1.4 SCIENTIFIC/MANAGEMENT DECISION POINT (SMDP)

7.2.1.5 FINAL SERA REPORT

The contractor shall submit the screening ecological risk assessment report (Tasks 7.2.1.1 and 7.2.1.2) within 30 days after completion of Task 7.2.1.3.

7.2.2 BASELINE ECOLOGICAL RISK ASSESSMENT

7.2.2.1 PROBLEM FORMULATION PROCESS (ERA Step 3)

ERA Step 3 of the eight-step process initiates the problem-formulation phase of the baseline ecological risk assessment. ERA Step 3 refines the screening-level problem formulation and, with input from stakeholders and other involved parties, expands on the ecological issues that are of concern at the particular site. In the screening-level assessment, conservative assumptions were used where site-specific information was lacking. In ERA Step 3, the results of the screening assessment and additional site-specific information are used to determine the scope and goals of the baseline ecological risk assessment. ERA Steps 3 through 7 are required only for sites for which the screening-level assessment indicated a need for further ecological risk evaluation.

Problem formulation at ERA Step 3 includes the following activities: Refining preliminary contaminants of ecological concern; Further characterizing ecological effects of contaminants; Reviewing and refining information on contaminant fate and transport, complete exposure

pathways, and ecosystems potentially at risk; Selecting assessment endpoints; and Developing a conceptual model with working hypotheses or questions that the site investigation will address.

At the conclusion of ERA Step 3, there is a SMDP, which consists of agreement on four items: the assessment endpoints, the exposure pathways, the risk questions, and conceptual model integrating these components. The products of Step 3 are used to select measurement endpoints and to develop the ecological risk assessment sampling and analysis plan (SAP) for the site in ERA Step 4. ERA Steps 3 and 4 are, effectively, the data quality objective (DQO) processes for the baseline ecological risk assessment.

A. REFINEMENT OF PRELIMINARY CONTAMINANTS OF CONCERN.

B. LITERATURE SEARCH ON KNOWN ECOLOGICAL EFFECTS

Literature search will be limited to the previous two years.

C. CONTAMINANT FATE AND TRANSPORT, ECOSYSTEMS POTENTIALLY AT RISK, AND COMPLETE EXPOSURE PATHWAYS

1. Contaminant Fate and Transport
2. Ecosystems Potentially at Risk
3. Complete Exposure Pathways

D. SELECTION OF ASSESSMENT ENDPOINTS

E. THE CONCEPTUAL MODEL AND RISK QUESTIONS

1. Conceptual Model (refinement of Task 1.2.1).
2. Risk Questions
3. Draft Technical Memorandum on Assessment Endpoints (AE), Exposure Pathways (EP), and Conceptual Models (CM) within 30 days of completion of Task 7.2.1.3.

F. SCIENTIFIC/MANAGEMENT DECISION POINT (SMDP)

1. Final Technical Memorandum on Assessment Endpoints (AE), Exposure Pathways (EP), and Conceptual Models (CM) within 30 days of completion of draft Technical Memorandum.

7.2.2.2 STUDY DESIGN AND DATA QUALITY OBJECTIVE PROCESS (ERA Step 4)

The site conceptual model begun in ERA Step 3, which includes assessment endpoints, exposure pathways, and risk questions or hypotheses, is completed in ERA Step 4 with the development of measurement endpoints. The conceptual model then is used to develop the study design and data quality objectives. The products of Step 4 are the ecological risk assessment SAP, which describe the details of the site investigation as well as the data analysis methods and data quality objectives (DQOs). As part of the DQO process, the SAP specifies acceptable levels of decision errors that will be used as the basis for establishing the quantity and quality of data needed to support ecological risk management decisions. The lead risk assessor and the EPA RPM should agree that the SAP describe a study that will provide the EPA RPM with the information needed to fulfill the

requirements of the baseline risk assessment and to incorporate ecological considerations into the site remedial process.

A. ESTABLISHING MEASUREMENT ENDPOINTS

1. Species/Community/Habitat Considerations
2. Relationship of the Measurement Endpoints to the Contaminant of Concern
3. Mechanisms of Ecotoxicity

B. STUDY DESIGN

1. Bioaccumulation and Field Tissue Residue Studies
2. Population/Community Evaluations
3. Toxicity Testing

C. DATA QUALITY OBJECTIVES AND STATISTICAL CONSIDERATIONS

1. Data Quality Objectives
2. Statistical Considerations

D. CONTENTS OF FIELD ERA SAMPLING AND ANALYSIS PLAN

1. Sampling and Analysis Plan (SAP). This sampling plan should be combined with the sampling plan in Task 7.1.2 (B).
2. Field Verification of Sampling Plan and Contingency Plans
3. Preliminary Sampling and Analysis Plan for Field ERA Components within 30 days of completion of Technical Memorandum on Assessment Endpoints, Exposure Pathways and Conceptual Models (Task 7.2.2.1F).

E. SCIENTIFIC/MANAGEMENT DECISION POINT (SMDP)

7.2.2.3 VERIFICATION OF FIELD SAMPLING DESIGN (ERA Step 5)

Before the SAP is signed, it is important to verify that the field sampling plan they specify is appropriate and implementable at the site. Sampling design, the testable hypotheses, exposure pathway models, and measurement endpoints are evaluated for their appropriateness and implementability. The assessment endpoint(s), however, should not be under evaluation in this step; the appropriateness of the assessment endpoint should have been resolved in ERA Step 3. If an assessment endpoint is changed at this step, the risk assessor must return to ERA Step 3, because the entire process leading to the actual site investigation in ERA Step 6 assumes the selection of appropriate assessment endpoints.

A. DETERMINING SAMPLING FEASIBILITY

B. REPORT ON FIELD VERIFICATION

C. SCIENTIFIC/MANAGEMENT DECISION POINT (SMDP)

- D. FINALIZE SAMPLING AND ANALYSIS PLAN FOR FIELD ERA COMPONENTS
within 30days of completion of Preliminary Sampling and Analysis Plan (Task 7.2.2.2D).

7.2.2.5 SITE INVESTIGATION AND DATA ANALYSIS PHASE (ERA Step 6)

Information collected during the site investigation is used to characterize exposures and ecological effects. The site investigation includes all of the field sampling and surveys that are conducted as part of the ecological risk assessment. The site investigation and analysis of exposure and effects should be straightforward, following the SAP developed in Step 4 and tested in Step 5. Exposure characterization relies heavily on data from the site investigation and can involve fate-and-transport modeling. Much of the information for characterizing potential ecological effects was gathered from the literature review during problem formulation, but the site investigation might provide evidence of existing ecological impacts and additional exposure-response information.

A. SITE INVESTIGATION

1. Changing Field Conditions
2. Unexpected Nature or Extent of Contamination
3. Field Sampling Data Report
4. Characterize Exposures
5. Characterize Ecological Effects
6. Report on Preliminary Analysis of Data

B. SCIENTIFIC/MANAGEMENT DECISION POINT (SMDP)

7.2.2.6 RISK CHARACTERIZATION (ERA Step 7)

In risk characterization, data on exposure and effects are integrated into a statement about risk to the assessment endpoints established during problem formulation. A weight-of-evidence approach is used to interpret the implications of different studies or tests for the assessment endpoints. In a well-designed study, risk characterization should be straightforward, because the procedures were established in the SAP. The risk characterization section of the baseline ecological risk assessment should include a qualitative and quantitative presentation of the risk results and associated uncertainties.

A. RISK ESTIMATION

B. RISK DESCRIPTION

1. Threshold for Effects on Assessment Endpoints
2. Likelihood of Risk
3. Additional Risk Information

C. UNCERTAINTY ANALYSIS

1. Categories of Uncertainty
2. Tracking Uncertainties

7.2.2.7 DRAFT ECOLOGICAL RISK ASSESSMENT REPORT

7.2.2.8 FINAL ECOLOGICAL RISK ASSESSMENT REPORT

After the Contractor has received comments from EPA on the Draft ERA, the contractor shall revise the ERA. Based on the number of comments received, EPA may elect to have the final ERA incorporated in the RI/FS report or may have the final ERA as a separate document. The contractor shall contact the RPM for instructions.

TASK 8 TREATABILITY STUDY/PILOT TESTING

Treatability studies shall be performed where necessary to evaluate the feasibility of candidate remedial technologies required to address risks to human health or the environment from sediment contaminants within the Area of Concern. The results of any treatability testing will be utilized to support the screening and selection of remedial technologies in the Feasibility Study. If applicable, testing results and operating conditions developed from the treatability studies will be used in the detailed design of the selected remedial technology.

8.1. IDENTIFICATION OF CANDIDATE SOURCE AREAS, PATHWAYS, AND/OR MEDIA.

Sediment areas for inclusion into the treatability program are as follows:

1. Sediment areas which may need to be addressed on an accelerated basis as identified in or prior to the Initial Conceptual Site Model (Task 1.2.1)
- B. Other candidate areas identified during the Remedial Investigation and Risk Assessment that represent a risk to human health or the environment.

8.2 IDENTIFICATION OF CANDIDATE TECHNOLOGIES.

The need for treatability testing to evaluate remedial technologies for the sediment contamination identified in Task 8.1 will be determined on the basis of the following considerations as supported by the DQO process:

- A. A screening of remedial technologies as limited in Task 3.1.3 for the sediment area of interest based on effectiveness, implementability and cost factors. This effort shall

include an evaluation of the existing information in the context of the site-specific application.

- B. Treatability testing may be conducted where necessary to: 1) support an accelerated response objective as agreed to by Contractor and EPA/LDEQ, or 2) address a data gap critical to the Feasibility Study which cannot be satisfied on the basis of existing information.

Contractor shall prepare an initial technical memorandum, subject to EPA/LDEQ approval, that addresses the need for treatability testing on the basis of the above criteria for those areas identified in Task 8.1. This memorandum shall be submitted as an addendum to the RI Work Plan. Additional technical memoranda may be prepared prior to or following the submittal of the above memorandum as other areas are identified as candidates for treatability testing.

Where it is determined that treatability testing is required, the Contractor shall submit a workplan to EPA/LDEQ outlining the steps and data necessary to evaluate and initiate the treatability testing program. Once a decision to perform treatability testing has been made, the Contractor and EPA/LDEQ will decide on the type of testing to be conducted (e.g. bench versus pilot).

8.3. IMPLEMENTATION OF TREATABILITY STUDIES

Where treatability studies are conducted, the deliverables shall include a work plan, a sampling and analysis plan, and a final treatability evaluation report. EPA/LDEQ may also require a treatability study health and safety plan, where appropriate.

8.3.1. Treatability Study Work Plan

The Contractor shall prepare a treatability study work plan or amendment to the original site work plan for EPA/LDEQ review and approval describing the site, remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, residual waste management and schedule (e.g., testing, deliverables, etc.). The data quality objectives (DQOs) for the treatability study should be documented as well. If a pilot scale treatability study is to be performed, the pilot-scale work plan will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If the study is to be performed off-site, permitting requirements will be addressed.

8.3.2. Treatability Study Sampling and Analysis Plan

If the original Sampling and Analysis Plan (Task 1.2.2) is not adequate for defining the activities to be performed during the treatability studies, a separate treatability study Sampling and Analysis Plan or amendment to the original site Sampling and Analysis Plan will be prepared by the Contractor for EPA review and approval.

8.3.3. Treatability Study Health and Safety Plan

A health and safety plan shall be developed by the Contractor for treatability studies. The treatability study health and safety plan will include the components listed in Task 1.2.3, and will specifically address air monitoring for possible exposures to workers and the community. EPA does not "approve" the treatability study health and safety plan.

8.3.4. Treatability Study

Following completion of treatability studies, the Contractor shall analyze and interpret the results in a technical report to EPA/LDEQ. Depending on the sequence of activities, this report may be a part of the RI/FS report or a separate deliverable. The report shall evaluate each technology's effectiveness, implementability, cost and actual results as compared with predicted results. The report will also evaluate full-scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

TASK 9 REMEDIAL INVESTIGATION REPORT

To prepare the report, the contractor shall use "Guidance for Conducting Remedial Investigations / Feasibility Studies Under CERCLA," EPA/540/G-80/004, October 1988 as a general guidance. The EPA shall use the "Remedial Investigation Report" to develop a record of decision in accordance with the *Guidance on Preparing Superfund Remedial Decision Documents*, EPA 540-R-98-031, June 19, 1998, Chapter 6.0, "Writing the Record of Decision." Prior to preparing the report, the Contractor shall become familiar with Chapter 6.0.

TASK 10 REMEDIAL ALTERNATIVES SCREENING

The following activities will be performed by the Contractor as a function of the development of remedial alternatives as limited in Task 3.1.3.

10.1. Remedial Action Objectives

Based on the baseline risk assessment, the Contractor will develop the site-specific remedial action objectives to provide adequate protection of human health and the environment. These remedial action objectives will specify the contaminants and media of interest,

exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each selected exposure pathway).

10.2. Response Actions

The Contractor will develop general response actions, as limited in Task 3.1.3, for sediment contamination defining containment, stabilization, excavation, or other actions, singly or in combination, to satisfy the remedial action objectives. The Contractor will identify areas or volumes to which general response actions may apply, taking into account requirements for level of protection as identified in the remedial action objectives and the chemical and physical characterization of the Area of Concern.

10.3. Remedial Technologies

General response actions will be refined to specify remedial technology types. Technology process options for each of the technology types will be identified either concurrent with the identification of technology types, or following the screening of the considered technology types. Process options will be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain representative processes for each applicable technology type.

10.4. Remedial Alternatives

The Contractor will assemble selected technologies into alternatives for each affected medium or area. A summary of the assembled alternatives and their related action-specific ARARs will be prepared by the Contractor for inclusion in a technical memorandum.

The Contractor will refine the remedial alternatives to identify contaminant volume addressed by the proposed process and sizing of critical unit operations as necessary. Sufficient information will be collected for an adequate comparison of alternatives.

TASK 11 REMEDIAL ALTERNATIVES EVALUATION

The Contractor will conduct a detailed analysis of sediment alternatives which will consist of an analysis of each option against a set of nine evaluation criteria and a comparative analysis of all options using the same evaluation criteria as a basis for comparison. This analysis is the final task to be performed by the Contractor during the FS.

11.1 Analysis of Alternatives

The Contractor will apply nine evaluation criteria to the assembled remedial alternatives to ensure that the selected remedial alternative will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include:

- A. Overall protection of human health and the environment;
- B. Compliance with ARARs;
- C. Long-term effectiveness and permanence;
- D. Reduction of toxicity, mobility, or volume;
- E. Short-term effectiveness;
- F. implementability;
- G. Cost;
- H. State acceptance; and
- I. Community acceptance.

For each alternative the Contractor should provide: (1) a technical description of the alternative that outlines the contaminated media management strategy involved and identifies the key ARARs associated with each alternative; and (2) a discussion that profiles the performance of that alternative with respect to each of the evaluation criteria. If the Contractor does not have direct input on criteria (8) State acceptance and (9) community acceptance, these will be addressed by EPA/LDEQ.

11.2 Comparative Analysis

The Contractor will perform a comparative analysis between the remedial alternatives. That is, each alternative will be compared against the others using the evaluation criteria as a basis of comparison. Identification and selection of the preferred alternative are reserved by EPA/LDEQ. A table summarizing the results of this analysis should be prepared. Once the individual analysis is complete, the alternatives will be compared and contrasted to one another with respect to each of the evaluation criteria.

TASK 12 FS REPORT AND RI/FS REPORT

The Contractor shall develop a Feasibility (FS) Report consisting of a detailed analysis of alternatives and cost-effectiveness analysis in accordance with NCP 300.68(h)(3)(i)(2). The report shall contain a summary of alternative remedial actions in accordance with Chapter 3, NCP 300.68(h)(3)(i)(2)(A); 2) Cost Analysis in accordance with Chapter 7, NCP 300.68(h)(3)(i)(2)(B); 3) Institutional analysis in accordance with Chapter 4, NCP 300.68(h)(3)(i)(2)(C); 4) Public-health

analysis in accordance with Chapter 5, NCP 300.68(h)(3)(i)(2)(D); 5) Environmental analysis in accordance with Chapter 6, NCP 300.68(h)(3)(i)(2)(E).

12.1 Prepare Draft FS Report. The contractor shall prepare a draft FS and submit to EPA according to the schedule in the RI/FS work plan. The FS Report should contain the following:

- ! Summarizes Feasibility Study Objectives
- ! Summarizes Remedial Objective
- ! Articulate General Response Action
- ! Identification & Screening of Remedial Technologies
- ! Remedial Alternatives Description
- ! Detailed Analysis of Remedial Alternatives. The contractor's technical feasibility considerations shall include the careful study of any problems that may prevent a remedial alternative from mitigating site problems. Therefore, the site characteristics from the RI must be kept in mind as technical feasibility of the alternative is studied. Specific items to be addressed are reliability (operation over time), safety, operation and maintenance, ease with which the alternative can be implemented, and time needed for implementation.
- ! Summary and Conclusions

12.2 Prepare Final FS Report. After EPA review of the draft FS Report, the contractor will incorporate EPA comments and submit the final FS Report.

TASK 13 POST RI/FS SUPPORT (Not Included)

The contractor shall provide technical support required for preparation of the ROD for the site. The contractor's support shall include the following support activities: attendance at public meetings, briefings, & technical meetings with PRPs, review of presentation materials, technical assistance on review of the Responsiveness Summary and Proposed Plan & ROD, and any review of the a Feasibility Study Addendum

TASK 14 NEGOTIATION SUPPORT (Not Included)

The contractor shall provide negotiation support which shall include the following activities: attendance at negotiation sessions and meetings and additional review and comments on PRP documents.

TASK 15 ADMINISTRATIVE RECORD (Not Included)

The contractor shall provide Administrative Record support which shall include the following activities: coordination with the Administrative Record Coordinator, assistance in document compilation, assistance in preparation of the Draft and Final Administrative Record Index,

assistance in the coordination of the duplication of the administrative index, and assistance in the assemblance of the Administrative Record and Index.

TASK 16 WORK ASSIGNMENT CLOSEOUT

This task includes work efforts related to work assignment closeout.

- 16.1 Return of documents to EPA or other document repositories.
- 16.2 File duplication in accordance with Region 6 microfilming standard, distribution, and storage.
- 16.3 File archiving to meet Federal Records Center requirements.
- 16.4 Prepare a Work Assignment Closeout Report (WACR) as directed in the WACN or in accordance with Regional guidance.

ATTACHMENTS

Attachment 1
Summary of Major Submittals for the Remedial Investigation/Feasibility Study at Calcasieu Estuary

Note: Dates are from receipt of Work Assignment

TASK	DELIVERABLE	NUMBER OF COPIES	DUE DATE (calendar days)
1.1.4	Workplan	10	60 days
1.1.6	Revised Workplan (if needed)		90 days
1.2.1	Initial Site Conceptual Model(s) for all 4 areas	10	75 days
1.2.2 a	Draft Sampling Analysis Plan (SAP)- phase I	10	90 days
1.2.2b	Final Sampling Analysis Plan (SAP)- phase I	10	125 days
7.1.1	Contaminant Identification for HHRA	10	105 days
7.1.2	Human Health Exposure Assessment Tech memorandum	10	135 days
7.1.2.1	SAP-phase II [combine plan with Task 7.2.2.2 (D)]	10	225 days
7.1.5	Draft HHRA	10	375 days
7.1.6	Final HHRA	10	435 days
7.2.1.3	Preliminary Screening Ecological Risk Assessment (ERA)	10	105 days
7.2.1.5	Final SERA	10	135 days
7.2.2.1 (E)	Draft Tech Memo on AE, EP, CM	10	135 days
7.2.2.1(F)	Final Tech Memo on AE, EP, CM	10	165 days
7.2.2.2(D)	Preliminary ERA sampling and Analysis plan-SAP Phase II	10	195 days
7.2.2.3	Final SAP-phase II (combined with Task 7.1.2.1)	10	225 days
3.2	SAP -Phase III (if required)	10	TBD
7.2.2.7	Draft ERA	10	375 days
7.2.2.8	Final ERA	10	435 days
12.1	Draft RI/FS	10	375 days
12.2	Final RI/FS	10	435 days

Attachment 2
Regulations and Guidance Documents

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process:

1. American National Standards Practices for Respiratory Protection. American National Standards Institute Z88.2-1980, March 11, 1981.
2. ARCS Construction Contract Modification Procedures September 89, OERR Directive 9355.5-01/FS.
3. CERCLA Compliance with Other Laws Manual, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (DRAFT), OSWER Directive No. 9234.1-01 and -02.
4. Community Relations in Superfund — A Handbook, U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9230.0-3B.
5. A Compendium of Superfund Field Operations Methods, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.
6. Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, U.S. EPA, Office of Solid Waste and Emergency Response, October 1986, OSWER Directive No. 9472.003.
7. Contractor Requirements for the Control and Security of RCRA Confidential Business Information, March 1984.
8. Data Quality Objectives for Remedial Response Activities, U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.
9. Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, U.S. EPA Region IX, Quality Assurance Office (revised periodically).
10. EPA NEIC Policies and Procedures Manual, EPA-330/9-78-001-R, May 1978, revised November 1984.
11. Federal Acquisition Regulation, Washington, DC: U.S. Government Printing Office (revised periodically).
12. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final, U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive NO. 9355.3-01.
13. Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potential Responsible Parties, U.S. EPA Office of Emergency and Remedial Response, EPA/540/G-90/001, April 1990.
14. Guidance on Expediting Remedial Design and Remedial Actions, EPA/540/G-90/006, August 1990.
15. Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, U.S. EPA Office of Emergency and Remedial Response (DRAFT), OSWER Directive No. 9283.1-2.
16. Guide for Conducting Treatability Studies Under CERCLA, U.S. EPA, Office of Emergency and Remedial Response, Prepublication version.
17. Guide to Management of Investigation-Derived Wastes, U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9345.3-03FS, January 1992.
18. Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.

19. Health and Safety Requirements of Employees Employed in Field Activities, U.S. EPA, Office of Emergency and Remedial Response, July 12, 1982, EPA Order No. 1440.2.
20. Interim Guidance on Compliance with Applicable of Relevant and Appropriate Requirements, U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.
21. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.
22. Methods for Evaluating the Attainment of Cleanup Standards: Vol. 1, Soils and Solid Media, February 1989, EPA 23/02-89-042; vol. 2, Ground water (Jul 1992).
23. National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, Federal Register 40 CFR Part 300, March 8, 1990.
24. NIOSH Manual of Analytical Methods, 2nd edition. Volumes I-VII for the 3rd edition, Volumes I and II, National Institute of Occupational Safety and Health.
25. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/Environmental Protection Agency, October 1985.
26. Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions, February 19, 1992, OSWER Directive 9355.7-03.
27. Procedure for Planning and Implementing Off-Site Response Actions, Federal Register, Volume 50, Number 214, November 1985, pages 45933-45937.
28. Procedures for Completion and Deletion of NPL Sites, U.S. EPA, Office of Emergency and Remedial Response, April 1989, OSWER Directive No. 9320.2-3A.
29. Quality in the Constructed Project: A Guideline for Owners, Designers and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment, American Society of Civil Engineers, May 1988.
30. Remedial Design and Remedial Action Handbook, U.S. EPA, Office of Emergency and Remedial Response, June 1995, OSWER Directive No. 9355.5-22.
31. Revision of Policy Regarding Superfund Project Assignments, OSWER Directive No. 9242.3-08, December 10, 1991. [Guidance, p. 2-2]
32. Scoping the Remedial Design (Fact Sheet), February 1995, OSWER Publ. 9355-5-21 FS.
33. Standard Operating Safety Guides, U.S. EPA, Office of Emergency and Remedial Response, November 1984.
34. Standards for the Construction Industry, Code of Federal Regulations, Title 29, Part 1926, Occupational Health and Safety Administration.
35. Standards for General Industry, Code of Federal Regulations, Title 29, Part 1910, Occupational Health and Safety Administration.
36. Structure and Components of 5-Year Reviews, OSWER Directive No. 9355.7-02, May 23, 1991. [Guidance, p. 3-5]
37. Superfund Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, April 1990, EPA/540/G-90/001.
38. Superfund Remedial Design and Remedial Action Guidance, U.S. EPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.0-4A.
39. Superfund Response Action Contracts (Fact Sheet), May 1993, OSWER Publ. 9242.2-08FS.
40. TLVs-Threshold Limit Values and Biological Exposure Indices for 1987-88, American Conference of Governmental Industrial Hygienists.

41. Treatability Studies Under CERCLA, Final. U.S. EPA, Office of Solid Waste and Emergency Response, EPA/540/R-92/071a, October 1992.
42. USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, U.S. EPA, Office of Emergency and Remedial Response, July 1988.
43. USEPA Contract Laboratory Program Statement of Work for Organic Analysis, U.S. EPA, Office of Emergency and Remedial Response, February 1988.
44. User's Guide to the EPA Contract Laboratory Program, U.S. EPA, Sample Management Office, August 1982.
45. Value Engineering (Fact Sheet), U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9355.5-03FS, May 1990.